Flammable and Combustible Liquids - 1910.106

- Primary basis of standard is the National Fire Protection Association's publication NFPA 30, Flammable and Combustible Liquids Code
- Applies to the handling, storage, and use of flammable and combustible liquids with a flash point below 200F
- Two primary hazards associated with flammable and combustible liquids are explosion and fire
- Standard addresses primary concerns of design and construction, ventilation, ignition sources and storage
- For OSHA's specific requirements regarding flammable and combustible liquids, consult 29 CFR 1910.106

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There are a number of definitions included in 1910.106. These definitions were derived from consensus standards, and were not uniquely developed for OSHA regulations. Some of the more important definitions are discussed below.

- Aerosol shall mean a material which is dispensed from its container as a mist, spray, or foam by a propellant under pressure.
- Approved shall mean approved or listed by a nationally recognized testing laboratory.
- Boiling point shall mean the boiling point of a liquid at a pressure of 14.7 pounds per square inch absolute (psia).
 This pressure is equivalent to 760 millimeters of mercury (760 mm Hg).

At temperatures above the boiling point, the pressure of the atmosphere can no longer hold the liquid in the liquid state and bubbles begin to form. The lower the boiling point, the greater the vapor pressure at normal ambient temperatures and consequently the greater the fire risk.

- · Container shall mean any can, barrel, or drum.
- Closed container shall mean a container so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

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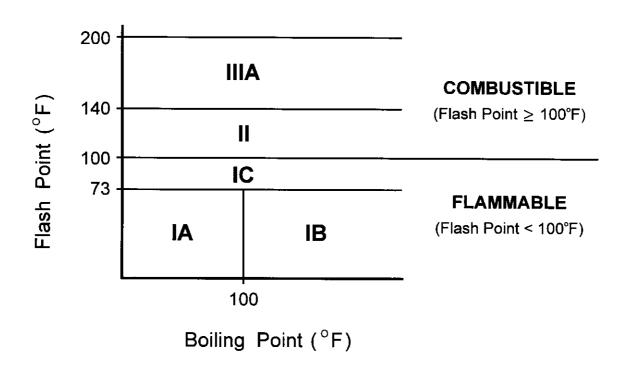
- Fire area shall mean an area of a building separated from
 the remainder of the building by construction having a fire
 resistance of at least 1 hour and having all communicating
 openings properly protected by an assembly having a fire
 resistance rating of at least 1 hour.
 Flash point means the minimum temperature at which a
- Flash point means the minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid. The flash point is normally an indication of susceptability to ignition. The expression "low flash - high hazard" applies.

The flash point is determined by heating the liquid in test equipment and measuring the temperature at which a flash will be obtained when a small flame is introduced in the vapor zone above the surface of the liquid.

- Combustible liquid means any liquid having a flash point at or above 100F (37.8C).
- Flammable liquid means any liquid having a flash point below 100F (37.8C) or higher, the total of which make up 99 percent or more of the total volume of the mixture.

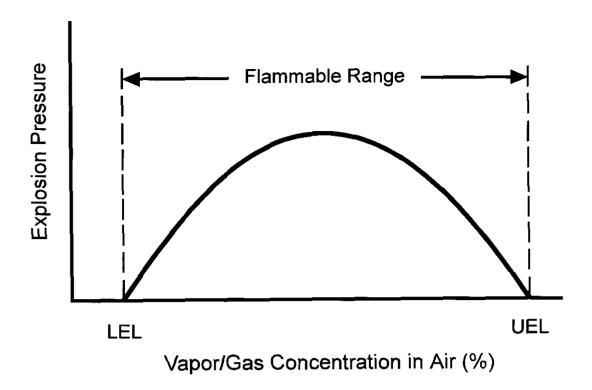
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Classes of Flammable and Combustible Liquids as Defined in 29 CFR 1910.106



 Portable tank shall mean a closed container having a liquid capacity over 60 U.S. gallons and not intended for fixed installation. 	
 Safety can shall mean an approved container, of not more than 5 gallons capacity, having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure. 	
Vapor pressure is a measure of a liquid's propensity to evaporate. The higher the vapor pressure, the more volatile the liquid and, thus, the more readily the liquid gives off	
vapors.	
 Ventilation as specified in this section is for the prevention of fire and explosion. It is 	

considered adequate if it is sufficient to prevent accumulation of significant quantities of vapor-air mixtures in concentration over one-fourth of the lower flammable limit.



In popular jargon, a vapor/air mixture below the flammable limit is too "lean" to burn or explode, and a mixture above the upper flammable limit is too "rich" to burn or explode. No attempt is made to differentiate between the terms *flammable* and *explosive* as applied to the lower and upper limits of flammability.

Containers and Portable Tanks

- Applies only to storage of flammable or combustible liquids in drums or other containers (including flammable aerosols) not exceeding 60 gal. capacity and portable tanks less than 660 gal. capacity
- Only DOT approved containers and portable tanks may be used to store flammable and combustible liquids
- Portable tanks must have provision for emergency venting
- Maximum allowable sizes of various types of containers and portable tanks are specified

Storage Cabinets

- Not more than 60 gallons of Class I and/or Class II liquids, or not more than 120 gallons of Class III liquids may be stored in an individual cabinet.
- Both metal and wooden storage cabinets shall be designed and constructed to limit the internal temperature to not more than 325F when subjected to a standardized 10-minute fire test.
- Storage cabinets shall be conspicuously labeled, "Flammable - Keep Fire Away."
- The bottom, top, door, and sides of metal cabinets shall be at least No. 18 gage sheet metal and double walled with 1½-inch air space.
- The door shall be provided with a three-point lock, and the door sill shall be raised at least 2 inches above the bottom of the cabinet.

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Inside Storage Rooms

- Construction to comply with the test specifications in NFPA 251-1969, Standard Methods of Fire Tests of Building Construction and Materials
- Openings to other rooms or buildings shall be provided with approved self-closing fire doors and non-combustible liquid-tight raised sills or ramps at least 4 inches in height, or the floor in the storage area shall be at least 4 inches below the surrounding floor
- Permissible alternate to the sill or ramp is an open-grated trench inside of the room which drains to a safe location
- Room shall be liquid-tight where the walls join the floor

		
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Rating and Capacity

Storage in inside storage rooms shall comply with the following:

	STORAGE IN	INSIDE ROOMS	
Fire Protection Provided ²	Fire Resistance	Maximum Floor Area (ft²)	Total Allowable Quantities (gal/ft² floor area)
Yes	2 hr.	500	10
No	2 hr.	500	4*
Yes	1 hr.	150	5*
No _	1 hr.	150	2

^{*} NOTE: These numbers are incorrectly shown in 29 CFR 1910.106.

- Requirements for electrical wiring and equipment, ventilation, and maintenance of aisles at least 3 feet wide are also included
- Dispensing shall be only by approved pump or selfclosing faucet

² Fire protection system shall be sprinkler, water spray, carbon dioxide, or other system.

Storage Inside Buildings

- Egress
 - Storage shall not limit use of exits, stairways, or areas normally used for the safe egress of people
- Office Occupancies
 - Storage prohibited except that which is required for maintenance and operation of equipment
 - Storage shall be kept in closed metal containers stored in a storage cabinet or in safety cans or in an inside storage room not having a door that opens into that portion of the building used by the public
- General Purpose Public Warehouses
 - Tables refer to indoor storage which is confined in containers and portable tanks
 - Storage of incompatible materials that create a fire exposure (e.g., oxidizers, water-reactive chemicals, certain acids and other chemicals) is not permitted
- Warehouses or Storage Buildings
 - Sometimes referred to as outside storage rooms
 - Practically any quantity of flammable and combustible liquid can be stored in these buildings provided that they are stored in a configuration consistent with the tables in this paragraph

Fire Control

- Suitable fire control devices, such as small hose or portable fire extinguishers, shall be available where flammable or combustible liquids are stored
- Open flames and smoking shall not be permitted in these storage areas
- Materials which react with water shall not be stored in the same room with flammable or combustible liquids

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Incidental Storage or Use of Flammable or Combustible Liquids

- Applies to those portions of an industrial plant where the use and handling of flammable or combustible liquids is only incidental to the principal business, such as paint thinner storage in an automobile assembly plant, solvents used in the construction of electronic equipment, and flammable finishing materials used in furniture manufacturing
- Flammable or combustible liquids shall be stored in tanks or closed containers
- The quantity of liquid that may be located outside of an inside storage room or storage cabinet in a building or in any one fire area of a building shall not exceed:
 - ▶ 25 gallons of Class IA liquids in containers
 - 120 gallons of Class IB, IC, II, or III liquids in containers
 - 660 gallons of Class 1B, 1C, II, or III liquids in a single portable tank.

Handling Liquids at Point of Final Use

- Flammable liquids shall be kept in covered containers when not actually in use.
- Where flammable or combustible liquids are used or handled, except in closed containers, means shall be provided to dispose promptly and safely of leakage or spills.
- Flammable or combustible liquids shall be drawn from or transferred into vessels, containers, or portable tanks within a building only in the following manner:
 - (1) Through a closed piping system,
 - (2) From safety cans,
 - (3) By means of a device drawing through the top, or
 - (4) From containers or portable tanks by gravity through an approved self-closing valve.
- Transfer operations must be provided with adequate ventilation.
- Sources of ignition are not permitted in areas where flammable vapors may travel.
- Transferring liquids by means of air pressure on the container or portable tanks is prohibited.

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